

IN THE SPECIFICATION

Page 1, Line1: Title: Dental Hand Piece with Backflow Protection

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a dental hand piece, particularly to a dental hand piece using compressed air and having a high-pressure sealing ring to isolate ~~a~~ the drill head from the compressed air backflow, so that ~~sucking back~~ backflow of air is prevented. ~~Also,~~ power is increased and noise is reduced.

Page 1, Line26: In Taiwan, about 10% of hepatitis B cases are caused by infection of dental equipment with germs. Samples of water from treatment surfaces have tested positive for hepatitis B germs. The spread of the Aids virus by infected fluids is also a serious risk. Infection is not prevented by *previous* disinfection, not *even* by exchanging the drill head with every patient, but rather prevention is importantly improved by blocking backflow of air in the dental handpiece.

A conventional dental handpiece mainly comprises a handle and a drill head, which in turn has a casing and a rotor.

U.S. patent no. 6186784 "Autoclavable dental handpiece with disposable high-speed turbine" discloses a dental handpiece as shown in Fig. 6, having two bearings (100,141) a, an air turbine (95) b, an axis (DB) c, a drill head (B) d, a sealing ring boss on the turbine body (223) e, two cushioning rings alignment washers (110,147) f, a front ~~lid~~ base (211) g, and a ~~easing~~ cartridge body (207) h. The two bearings a are placed next to the air turbine b, respectively on both sides thereof and carry the axis c. The drill head d is fastened on the axis c.

As shown in Fig. 7, a rotating movement of the axis c is driven by compressed air passing through a handle, entering the casing through an inlet h1 and hitting blades of the air turbine. Thereby torque is exerted on the axis c. The air subsequently leaves the casing h through an outlet h2 and is released back through the handle to the outside environment. Since the air turbine b rotates at high speed and the inlet h1 and the outlet h2 share a common circuit of air flow with the air turbine b, any germs in the

environment, like hepatitis B germs or Aids viruses, ~~will~~ may be sucked through the outlet h2, enter a-  
the fluid system and infect previously disinfected spaces.

Page 3, Line5: The present invention can be more fully understood by reference to the following description and accompanying drawings.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Fig. 1 is a perspective view of the dental hand piece of the present invention when disassembled.

Fig. 2 is a sectional side view of the present invention.

Fig. 3 is a sectional side view of the present invention in the second embodiment.

Fig. 4 is a sectional side view of the present invention in the third embodiment.

Fig. 5 is a sectional side view of the present invention in the fourth embodiment.

Fig. 6 is a perspective view of a conventional dental hand piece.

Fig. 7 is a sectional side view of a conventional dental hand piece.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

As shown in Fig. 1, the dental hand piece of the present invention ~~mainly~~ comprises: a casing 10; an axis 20; front and rear bearings 30, 31; a turbine 40; a front ~~lid~~ housing cap 50; and a drill head 60. The casing 10 has an open front end and a closed rear end. An air inlet 11 is cut into the casing 10 above the front bearing 30, and an air outlet 12 is cut into the casing 10 above the rear bearing 31. The turbine 40 has a turbine wheel 42, carrying a plurality of blades 41, and is driven by compressed air. The front bearing 30 is placed in front of the turbine 40. The axis 20 carries the turbine 40 and the front and rear bearings 30, 31 and has a front end with a central hole 21. The rear end of the drill head 60 ~~at a rear end thereof~~ is inserted into the central hole 21. The front ~~lid~~ housing cap 50 seals the casing 10 at the front end thereof, with the drill head 60 passing through the front ~~lid~~ housing cap 50. A cushioning ring 51 and a sealing ring 52 are laid on the front bearing on a front side thereof, ensuring sealing of the interior of the casing 10 against the outside environment.

Referring to Fig. 2, the present invention works as follows. Compressed driving air passes through the air inlet 11 at the front end of the casing 10 and enters a ring-shaped channel 32 between the front bearing 30 and the casing 10. Between the drill head 60 and the air outlet 12 ~~in insulating layer~~ a seal is inserted, ensuring that infected air or fluid in the outer environment are not sucked towards the air outlet 12. The driving air is led by an axially deflecting ring towards the turbine 40, hitting the turbine blades 41 and via the axis 20 driving the drill head 60. Subsequently, the driving air, now having low pressure, moves axially into a ring-shaped channel 33 between the rear bearing 31 and the casing 10 and then passes through the air outlet 12, entering a backflow conduit in a handle. Being placed at the rear end of the casing 10, opposite the drill head 60, the air outlet 12 will not readily suck in infected fluid after the drill head has stopped rotating.

Referring to Figs. 3-5, for more effective driving of the rotational movement, the driving air hits the blades 41 of the air turbine 40 in axial direction, as led by the ring-shaped channels 32, 33 between the front and rear bearings 30, 31 and the casing 10. In addition, in various embodiments of the present invention, a front deflector 70 is placed in front of the air turbine 40, as shown in Fig. 3, or a rear deflector 80 is placed behind the air turbine 40, as shown in Fig. 4, or front and rear deflectors 70, 80 are respectively placed in front of and behind the air turbine 40, as shown in Fig. 5.

Furthermore, in a further embodiment of the present invention, a ~~closed case~~ housing of the drill head ~~is substituted for the casing 10 and~~ incorporates the front lid housing cap 50.

The differences in operation and effect between the present invention and conventional art are summarized as follows.

1. In the present invention, driving air is led through a ring channel and flows away from the drill head. A sealing ring between the front and rear ends, in particular between the drill head and the air outlet prevents infected fluid air or fluid from being sucked into the air outlet, whereas in conventional art there is no such sealing ring, and infected air and fluid is readily sucked back.

Page 5, line30:

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